

WHAT IS CLAIMED:

1. A Residential Communications Gateway (RCG) device that is capable of providing broadband communications services over a plurality of standard POTS lines, where said POTS lines are of the normal type and do not require any modifications whatsoever, nor is any other additional equipment required to be installed in the Class 5 office or any other PSTN facility. Said RCG device comprising:
 - one or more connections to the Public Switched Telephone Network (PSTN) via standard Plain-Old-Telephone Service (POTS) connections;
 - a wireless interface to connect to other wireless devices or wireless LANS as well as a multitude of other RCGs using said wireless interface;
 - a USB, firewire (IEEE 1394), Ethernet or other physical layer connections that may be or become standardized to connect physically to other equipment;
 - one or more derived POTS circuits that connect to any standard telephone devices;
 - a method to create an ad-hoc wireless network via direct wireless connections between devices as well as hopping said wireless connections among many far flung RCGs to create a network of wirelessly connected RCGs that far exceeds the wireless transmission distance of any single point-to-point wireless connection, in order to expand coverage area and increase bandwidth, said ad-hoc hybrid network consisting of a multitude RCG devices each with one or more POTS connections to the LEC that are all used in conjunction to provide high-speed, broadband services to a requesting RCG device wherein the aggregate POTS bandwidth is many times the speed of a single POTS line device can derive by itself;

a method of utilizing Voice over IP (VoIP), voice/data compression and IP packet routing and switched circuit techniques to communicate multiple derived telephone POTS circuits over a single POTS telephone line connected to the LEC;

a method of utilizing Voice over IP (VoIP), voice/data compression and IP packet routing and switched circuit techniques to communicate multiple derived telephone POTS circuits over a wireless network;

a method for the assignment of individual and unique telephone numbers, as those used by the PSTN, to the derived virtual POTS circuits that are carried over a single POTS circuit from the LEC, said derived POTS circuits having unique individual telephone numbers so that they can be used in the same fashion as if they were provided directly from the LEC, and where said derived POTS circuits are directed to individual RJ11 connectors on the RCG to which standard telephone devices are attached and are used in the normal fashion, with each telephone device attached to its own unique telephone number.

2. An RCG of claim 1 that dynamically allocates the POTS and wireless bandwidth between multiple local voice circuits and local data demands as well as requests for that bandwidth made by remote RCG devices;

and that dynamically allocates its physically connected POTS bandwidth to other RCGs not physically connected to said POTS line(s), requesting said bandwidth;

prioritizes local as well as remote bandwidth requirements on both POTS circuits as well as wireless connections;

3. An RCG of claims 1 and 2 that dynamically allocates separate and physically diverse POTS lines or wireless connections into a multilink group capable of aggregating the combined bandwidth of a plurality of said separate physically diverse POTS lines or wireless connections and providing said aggregate bandwidth to the benefit of a single, or a plurality of RCG device for the concurrent and high speed transmission of large or multiple files;

and that can utilize one or more of the separate and physically diverse POTS lines or wireless connections that are physically connected to other remote RCG devices as stand alone connections that are not grouped in a multilink configuration to the benefit of a single or a plurality of RCG devices for the concurrent high speed transmission of large or multiple files;

4. An RCG of claim 1 that creates and maintains POTS as well as wireless routing tables that constantly change and that are used to determine maximum routing efficiencies for Quality Of Service (QOS) and maximum bandwidth between local and remote POTS circuits as well as broadband wireless connections.

5. An RCG of claim 1 that provides dynamic bandwidth reallocation on-the-fly for a plurality of separate and physically diverse POTS lines or wireless connections.

6. An RCG of claim 1 that provides security by numerous options such as WEP, IPSEC, combination of proprietary and public security protocols; provides ultra high security by employing those standard security practices described above in conjunction with proprietary routing of individual IP packets over separate physical POTS lines or wireless channels, thus making it very difficult or impossible for

eavesdroppers to be able to monitor any conversation or data transfer since the individual IP packets are routed on-the-fly, in a completely random fashion, over completely separate and different POTS lines and/or wireless channels.

7. An RCG of claim 1 with an automatically initiated account activation service whereby simply installing the device will cause it to initiate the equipment configuration, network configuration, equipment registration, account activation and billing services.

8. An RCG of claim 1 with automatic creation of a wireless router table by polling other devices within its transmission range for their wireless routing tables.

9. An RCG of claim 1 that provides a failsafe lifeline support for power failure. Provides a means to allow users to have telephone service in the event of a power failure.